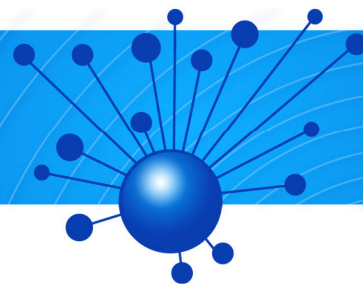# BIOSENSE

TECHNICAL OVERVIEW

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BioSense Program
Centers for Disease Control and Prevention
1600 Clifton Road, NE, E-06
Atlanta, GA 30333
Website: www.cdc.gov/phin/biosense
Email: BioSenseHelp@cdc.gov

Department of Health and Human Services
Centers for Disease Control and Prevention
Coordinating Center for Health Information and Service

Contents

1 Introduction

BioSense is designed to enable public health access to existing electronic clinical data in real-time to support early event detection and health situational awareness needed to characterize and manage a public health emergency. The system provides a view of the health status of a community to enable public health officials to better evaluate and appropriately respond to health threats.

Clinical information systems at healthcare provider organizations are the source of the data for BioSense. These existing data will be transmitted electronically to CDC as they become available in the source system(s).

BioSense requires Data Sources to transmit data using the Public Health Information Network Messaging System (PHINMS). PHINMS is written in JAVA and is certified to run on platforms that support the Sun Java Run-time Environment (JRE). The Sender (Client) is capable of sending messages as a batch or real time streaming data, receiving acknowledgements to those messages.

2 PHIN Messaging System (PHINMS)

PHINMS is a generic, standards-based, interoperable, and extensible message transport system. It is platform-independent and loosely coupled with systems that produce outgoing messages or consume incoming messages. PHINMS provides the services for secured and reliable data interchange.

PHINMS is a JAVA based application consisting of PHINMS Sender (Client) and PHINMS Receiver (Server). The PHINMS Sender is deployed on a Java Application Server running on a Server or a Workstation at the Data Source's site. The PHINMS Receiver resides within the Secure Data Network (SDN) at CDC's site. The data is exchanged over the secured internet connection using Secure Sockets Layer (SSL).

2.1 The Functions of PHINMS

The interface into PHINMS is through queues that allow almost any application, written in any language to make use of the system. In a typical BioSense data connection implementation scenario, an application running on the Data Source's site will extract the data of interest to BioSense from Data Source clinical systems via HL7 messages through an interface engine. The data extract will be processed and transformed into HL7 messages conforming to CDC's specification. The resulting HL7 messages are dropped into a message queue. The PHINMS Sender polls the message queue, retrieves individual HL7 message from the queue, wraps it in an ebXML envelope, encrypts and signs the ebXML document, and then transports the ebXML document over the Internet to the PHINMS Receiver.

The PHINMS Receiver receives the ebXML document, decrypts it, checks the signature, removes the HL7 message pay load from the ebXML wrapper, and drops the HL7 message pay load in a queue. A Message-Handler application pulls the HL7 message pay load from the queue for processing. Once processed, an Acknowledgement is sent back to PHINMS Sender.

PHINMS Process Flow
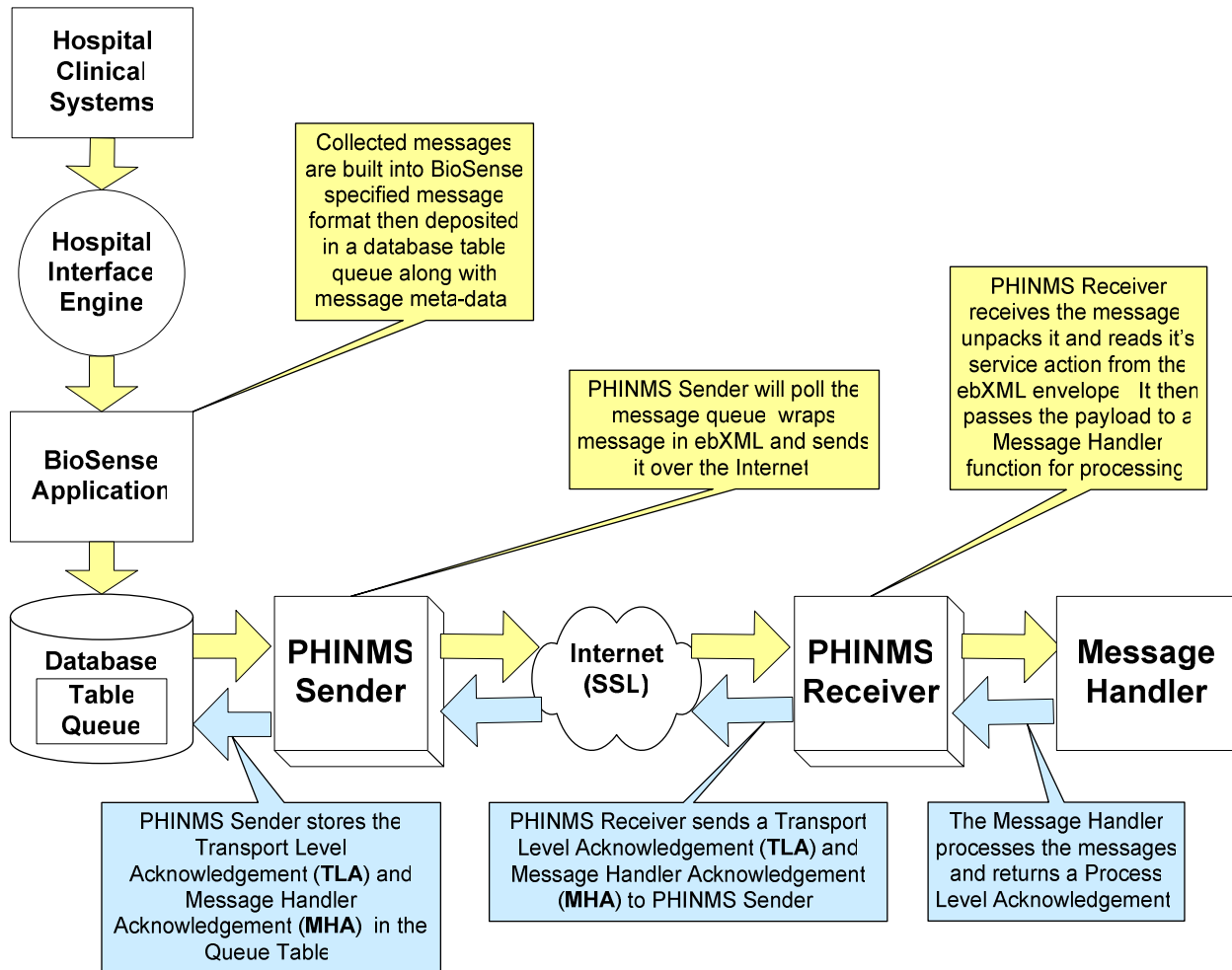
Figure 1: PHINMS Functional Components

The PHINMS information is available on CDC's PHIN webpage:
http://www.cdc.gov/phin/software-solutions/phinms/index.html

The available HL7 implementation guides can also be found on CDC's PHIN webpage:
http://www.cdc.gov/phin/architecture/implementation_guides/

3 BioSense Operating Environment

The basic facilities and equipment requirements for the Data Source setup are:

- "Always ON" Internet connection with firewall protection (Preferably multiple to create a DMZ for robust security from external threats coming from the internet to the organization LAN).
- Windows / UNIX / Linux Server or Workstation capable of running the PHINMS Client, Tomcat Application Server (Bundled with PHINMS), and Java - JDK1.4 (Bundled with PHINMS) or higher.
- BioSense data processing and HL7 translation software. Typical functions of the software include:
  - o BioSense ID management
  - o Data filtering and de-identification
  - o Standard vocabulary mapping
  - o HL7 message transformation
- Server capable of running BioSense data processing and HL7 translation software.
- Server capable of running JDBC compliant Database Server.

An example diagram of how PHINMS Client can be integrated into the Data Source's Network and securely connected to the Internet is as shown below:

Data Source Setup
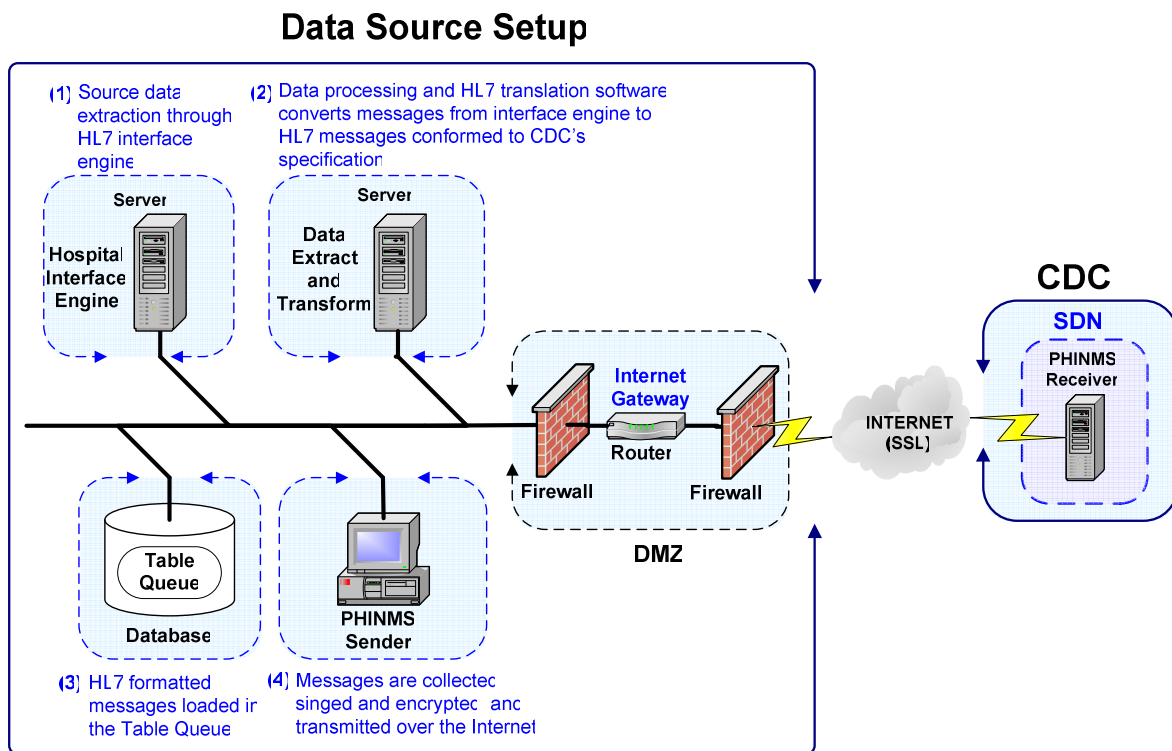
Figure 2: BioSense Operating Environment